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ABSTRACT

Three experiments investigated the hypothesis that, when interpreted in context, general terms are typically encoded on the basis of an instantiation. The results indicated that a particular term naming the expected instantiation of a general term was a better cue for the recall of a sentence than the general term itself, even though the general term had appeared in the sentence and the particular term had not. This could not have happened if people encode and store the core meanings of general terms. It was theorized that people instantiate in order to select, from among the indefinitely many meanings a term can have, a sense which permits a coherent overall interpretation of the message. (Author)

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Technical Report No. 10

INSTANTIATION OF GENERAL TERMS

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Abstract

Three experiments investigated the hypothesis that when interpreted in context general terms are typically encoded on the basis of an instantiation. The results indicated that a particular term naming the expected instantiation of a general term was a better cue for the recall of a sentence than the general term itself, even though the general term had appeared in the sentence and the particular term had not. This could not have happened if people encode and store the core meanings of general terms. It was theorized that people instantiate in order to select, from among the indefinitely many meanings a term can have, a sense which permits a coherent overall interpretation of the message.

Instantiation of General Terms

The idea we wish to propose is that a word does not have a meaning, rather it has a family of potential meanings. When comprehended in context the meanings of the words in an utterance are further articulated in a process of inferential interpolation based on "schemata" which embody one's knowledge of the language and world (Anderson, 1976). The effect with respect to nouns is usually to limit the scope of reference to a subset of the cases which would otherwise be denoted. If the context is rich and if the message is processed deeply a noun may be identified with a single real or imagined thing. This process will be called instantiation.

Theories of semantics and semantic memory are in accord with common sense on one fundamental point: Words have fixed, abstract meanings. That this must be so is taken to be necessary to explain the fact that people are facile at using and understanding a given word in an unbounded range of sentences and contexts. However, a close analysis will show that a word can have a somewhat different sense in each use. Nuances of meaning are easily appreciated in uses of game (Wittgenstein, 1968), cup (Labov, 1973), eat (Anderson & Ortony, 1975; Weinreich, 1966), and red (Halff, Ortony, & Anderson, 1976), for instance. The variations in sense of the word held in the sentences below provide another intuitively clear case.

The container held the cola.

The container held the door.

The brick held the door.

The policeman held the suspect.

The policeman held the traffic.

The speaker held their attention.

A similar demonstration could be made with most words in ordinary use. This fact creates a paradox. If people's representations for word meanings are abstract and, therefore, impoverished of contextually specific detail, then how could it be that fine gradations in sense are readily seen in any particular situation?

Hereafter in this paper we shall be concerned primarily with the meaning of general, concrete nouns. The usual presumption is that a person knows a rule which allows him/her to distinguish between members and nonmembers of the class signified by each noun in his/her vocabulary. The details of the theoretical machinery by which a rule is represented is not important for the moment, only that it is supposed to capture what is common to all members of the class. It was this view that Wittgenstein (1968, p. 31) was arguing against when he made his famous analysis of game:

> Consider for example the proceedings that we call 'games.' . . . What is common to them all?—Don't say: "There must be something common, or they would not be called 'games'"—but look and see whether there is anything common to all.—For if you look at them you will not see something that is common to all. . . (Italics in original.)

For most words it is difficult if not impossible to state a rule which gives the necessary and sufficient conditions for the word's use. A narrow rule will exclude cases commonly called by that name whereas a broad rule will include too many things. For example, neither a marble nor a shot put is called a ball, yet both meet the definition, "a spherical or ovoid body

of any kind for throwing, hitting or kicking in games or sports" (Webster's, 1964, p. 166). Following Wittgenstein we shall say that a word has a "family" of meanings. In a human family there is a greater or lesser degree of resemblance between the members. The nature of the resemblance shifts from member to member, without there necessarily being any one clear respect in which all are alike. The same is true, we argue, of the meanings of words. The set of criterial properties shifts from use to use. A property which is distinguishing in one case may be unimportant or even absent in another. To couch this position in the language of Smith, Shoben, and Rips (1974), there are no defining features, only characteristic ones. There are, in conclusion, persuasive a priori reasons for doubting that what we know of the meaning of a noun is an irreducible core of elements common to all uses. Consider instead the possibility that meaning is closely tied to particular uses, and that arriving at an appropriate meaning is usually a matter of instantiation.

Anderson and McGaw (1973) have presented some results consistent with the instantiation hypothesis. Sentences were presented containing general concrete nouns listed in the Battig and Montague (1969) norms. If people do instantiate, it was argued, it should be possible to predict the exemplars from the high frequency associates of the general terms. To illustrate, one of the sentences was, The animal ran toward the bush. Dog is the most frequent associate of animal so the instantiation was likely to be in terms of some sort of dog. Also selected from the nouns were two equiprobable low associates of the general term, one signifying a case bearing a greater resemblance than the other to the predicted instantiation. In the case of

animal the low associates were wolf and squirrel. A wolf is more like a dog than a squirrel is, thus it was reasoned wolf would make a better retrieval cue for the animal sentence than squirrel. The research did show that among the two matched low associates, the one referring to a case that resembled the most probable exemplar of the category named by the general term evoked the greater recall of the rest of the sentence. This suggests that people use exemplars to represent the meanings of nouns encountered in sentences.

The aim of the present research is to refine the instantiation hypothesis and provide a stronger test of it. Whereas Anderson and McGaw were able to predict exemplification fairly well using tables of norms, their materials were designed to minimize the influence of context. Context usually has a strong effect on instantiation. Evidence that this is the case has been obtained by Barclay, Bransford, Franks, McCarrell, and Nitsch (1974) and Anderson and Ortony (1975). In the latter study, subjects saw, for instance, either The container held the apples or The container held the cola and then received both basket and bottle as retrieval cues. Basket was a much more effective retrieval cue for the first sentence, bottle for the second. The data seem to indicate that context guides instantiation.

A weak form of the instantiation hypothesis could account for all of the results reported to date. It might be admitted that people make inferences about details, and that these details may become part of the memorial representation, while at the same time insisting that the essence of the representation to which an utterance gives rise consists of core meanings. Upon encountering the word animal, people might encode the abstract set of properties which all animals possess and then, in addition, guess that the

animal was a dog; or, having encoded the defining features of container, people might further predict from the context, held the cola, that the container was a bottle. The details people seem to incorporate in their representations of sentences could be merely mental footnotes, optional extras in no way central to the representations.

The stronger and more interesting view is that instantiation is integral to sentence comprehension and memory. This is the view which was explored in the present research. Sentences were constructed with general terms in the subject noun position. The remainder of each sentence was designed to cause a certain instantiation of the general term. Here is an example: The woman was outstanding in the theater. Most people will think of this woman as an actress. Later the cues woman and actress were presented. The subject was told to respond with the last word of the related sentence. The rationale is that if an abstracted meaning is the crucial part of a stored representation, the general term will always be the better cue, while if a specific encoding is integral to the representation, the particular term will be superior.

Of course, actress might work better in the case illustrated because it has a stronger association to other words in the sentence. Controls for preexisting associations were included in each of the experiments to be reported. In the first experiment there was a control sentence containing the same general term and same last word as each target sentence. For example, the sentence The woman worked near the theater does not produce an actress instantiation, yet theater would be recalled to the cue actress if an association between these words were of overriding importance. The strong

version of the instantiation hypothesis will have received a measure of support if the particular terms are better cues than the general terms for the target sentences but worse cues for the control sentences.

Experiment 1

Method

Subjects. The subjects were 40 undergraduates enrolled in an introductory educational psychology course. An additional 45 subjects from the same population participated in a preliminary study to norm the materials.

Materials. A total of 39 pairs of sentences were created. The target sentence in each pair was designed to bias the interpretation of the subject noun in the direction of a certain exemplification. The related control sentence contained the same subject noun and the same last word, but it was constructed to avoid constraining the interpretation of the subject noun. For purposes of a norming study, two lists were composed each of which contained one sentence from each pair. About half of the items within a list were target sentences, the remainder control sentences. Subjects saw one or another of the lists. They were asked to judge each sentence in terms of whether a particular example came to mind for the subject noun, and if so to write down that example. Selected for use in the experiment were 20 pairs in which (a) the target sentence elicited a single example frequently, and other examples seldom if at all; and (b) the control sentence elicited few examples, or at least no one example frequently.

Design and procedure. Two complimentary lists were prepared consisting of 10 target and 10 control sentences. For each pair, the target sentence was in one list, the control sentence in the other. The lists were presented

in mimeographed booklets with one sentence per page. The experiment was run in groups of about 20. Subjects were assigned to lists randomly and received one exposure of the list at a seven second rate, paced by tape recorded "beeps." Following the list there was a six minute interval during which subjects worked on the Hidden Patterns Test (French, Ekstrom, & Price, 1963), which requires identifying a pattern embedded in a series of abstract designs. The purpose of the interpolated task was to minimize recall from short-term, nonsemantic memory. Finally, subjects were given the cued recall test. For each sentence of the acquisition list, two cues appeared, the general term which had served as the subject noun of pairs of sentences and the particular term which designated the predicted instantiation of the target version. There were a total of 40 cues, each appearing on a separate page of the test booklet. In order to space encounters between related items and to control for possible priming effects, the cues were divided into two blocks. One cue for each sentence pair appeared in each block and half the cues in a block were general terms while half were particular terms. Block order was counterbalanced, and there were two random orders of cues within blocks. Instructions to the subjects stated that for each cue, they were to write down the last word of the sentence of which they were reminded.

Results and Discussion

Table 1 presents mean proportions of last words recalled. Synonyms, hyponyms, close superordinates, and close cohyponyms (cf. Anderson, 1974) were counted correct as well as verbatim responses. The interaction between type of sentence and type of cue was significant, as predicted, $\min F'(1,37) = 26.4$, $p < .01$. There were no effects due to block position.

Insert Table 1 about here

The experiment gave precisely the results which would be expected on the basis of the instantiation hypothesis. The cue naming the expected instantiation was substantially better at evoking the target sentence than the general term which had been the subject noun of that sentence. This is striking evidence for the instantiation hypothesis, for if the core meaning of the general term were encoded and stored the general term would inevitably make a better cue than a particular term which had not even appeared in the sentence. However, it might be questioned whether there were adequate grounds for discounting the possibility that the results were due to preexisting associations between the particular cue and the instantiation-guiding words in the target sentence. A control for an association to the response term had been included, but not one for the rest of the sentence. In some cases the remaining suggestive words were not very subtle, as in The animal barked at the shadows, and so an associative interpretation remained plausible. The purpose of Experiment 2 was to see if it could be ruled out.

Experiment 2

Method

Subjects. A total of 59 students in an undergraduate educational psychology course were recruited for the experiment and received class credit for their participation.

Materials. Twenty triples of sentences were constructed. Each triple included a target sentence intended to encourage a particular instantiation

of the subject noun. For example, The fish attacked the swimmer is likely to lead to an encoding of fish in terms of a shark. The attempt was made to avoid instantiation-guiding words which bore a salient relation to the expected exemplar. The second sentence in a triple was a control (Control 1) which contained the same subject noun and last word as the target, for instance, The fish avoided the swimmer. The third sentence was a control (Control 2) for the remaining words in the target sentence, for example, The Communists attacked the village. Two lists of 30 sentences, 10 of each type, were made up in a manner judged likely to minimize intralist intrusions on the cued recall test. For each triple, the target sentence was assigned to one list and the two control sentences to the other.

Design and procedure. Subjects were run in groups of 20 to 25. A subject received one or the other of the lists presented in a randomly assigned mimeographed booklet with one sentence per page. There were four randomizations of each list. Tape-recorded "beeps" paced exposure to the sentences at a rate of one every 10 seconds. Following one study trial subjects worked on the Hidden Patterns Test for five minutes. The subjects were then given five minutes for free recall of the sentences. The principal purpose of this was to determine whether the level of learning was the same for each type of sentence. Finally, the students received a cued recall test in the form of a booklet with one cue per page. The cues were the 20 general terms which had served as subject nouns and the 20 particular terms naming the expected instantiations of the subject nouns (e.g., fish and shark). There were eight different random orders of cues to preclude systematic position or sequence effects. The subject's task was to write down the last word of the sentence related to the cue.

Results and Discussion

Analysis of the free recall protocols, which were scored according to substance guidelines, showed no difference according to type of sentence, $F < 1$. Table 2 contains mean proportions correct on the cued recall test, which was also scored using substance criteria. The last word of the Control 2 sentence was never recalled given the general cue and recalled only twice given the particular cue. This type of sentence was, therefore, excluded from subsequent analysis. As in the first experiment, there was a significant interaction between type of sentence (Target or Control 1) and type of cue, $\min F'(1,84) = 7.5$, $p < .01$.

Insert Table 2 about here

The results were again consistent with the instantiation hypothesis. The data do not support an interpretation in terms of a process acting at the time of retrieval, based on associations between the particular cue and elements of the target sentence. The nature of the initial encoding of the sentence seems to be implicated, instead, and a very sensible explanation is that this initial encoding involves instantiation.

Experiment 3 was designed to test an interpretation that might be made of Rosch's (cf. 1973, 1975) hypothesis that people represent concepts in terms of "natural prototypes" or "focal examples" instead of abstract, critical attributes. She theorizes that categories have an internal structure in the sense that instances may vary according to their resemblance to the focal examples. She says (1973, p. 111), to illustrate, that "some breeds of 'dog' (such as retriever) are more representative of the 'meaning' of

'dog' than others (such as Pekinese)." While Rosch's views are in many respects similar to our own, there is one implication that we must resist. It could not be the case that a category is always represented by certain best examples. If we are correct, the appropriate exemplification should vary according to the context.

In Experiment 3, sentences were constructed using general terms from the Battig and Montague (1969) norms as the subject nouns. A target sentence was written for each term which, it was judged, would instantiate the concept signified by a certain low associate of the general term. A second sentence (Control 1) contained the same general term and last word but was written so that it would not suggest any particular instantiation. As in the previous study there was a third sentence (Control 2) to serve as a control for the remaining instantiating elements of the target sentence. Presented as retrieval cues were the indicated low associate and the most frequent associate of the general term. The idea was that in the right context almost any low associate can designate the "best" example of a concept. Thus, it was expected that the low associate would be more effective than the high associate for retrieval of the sentence in which the instantiation was constrained.

The reverse was expected for the Control 1 sentence, on the grounds that when the context is not very helpful people will instantiate by default with a high probability exemplar, such as the one named by the most frequent associate (cf. Anderson & McGaw, 1973). A low associate names a less probable example which is unlikely to serve as a default instantiation. Therefore, the low associate should be a relatively poor cue for the Control 1 sentence while the high associate should be a good one.

Experiment 3

Method

Subjects. Sixty-two introductory educational psychology students participated in this experiment in order to fulfill a course requirement.

Materials. Fifteen triples of sentences of the sort described above were prepared. The sentences were assigned to three lists in a way intended to minimize intralist intrusions. Each list contained one sentence from each triple and, in all, five sentences of each type.

Design and procedure. Subjects got one of the three lists, the cued recall test was presented in counterbalanced blocks as in Experiment 1, and subjects were asked to recall whole sentences; otherwise, the design and procedure were the same as in Experiment 2.

Results

There were no differences among sentence types in free recall. Table 3 shows the mean proportions of sentences on the cued recall test that met lenient, gist scoring criteria. The predicted interaction between type of sentence and type of cue appeared on the cued recall test, whether scores on the Control 2 sentences were excluded from the analysis, $\min F'(1,78) = 8.79$, $p < .01$, or discounted by subtracting them from scores on the target sentences, $\min F'(1,78) = 7.39$, $p < .01$. Block position was not significant, nor did it interact with any other variable, indicating that there were no priming effects due to the sentences having been cued twice.

Insert Table 3 about here

General Discussion

The present experiments showed that a word naming the expected instantiation of a general term was an especially effective cue for retrieval of other words in the sentence containing that general term. If you accept the principle that what people can recall depends upon what specifically they have encoded and stored (Tulving & Thompson, 1973; Reder, Anderson, & Bjork, 1974), then the evidence presented here indicates that general terms are encoded on the basis of exemplars. The fact that the particular terms were better cues for recall of target sentences than general terms actually contained in the sentences is difficult to square with any view which presumes that it is the fixed core meaning of a term which is encoded and stored.

Nor could it be that the meaning of a term is always captured in the same focal example. The last experiment showed that a low associate of a general term can be a better cue than the highest associate, a word which presumably names the most representative or typical example. Our interpretation of this fact is that, depending on the context, any instance can be a good example of a concept. Without context a robin may be ideally bird-like, but at the Thanksgiving table a robin is not the best instantiation of bird.

The experiments were designed to try to preclude the interpretation that the particular terms were the best cues for target sentences because of strong associations to the constituent words. The technique was to construct control sentences which involved the same words as a target sentence but did not constrain the interpretation of the subject noun to a certain exemplar. Particular cues were about twice as likely to evoke target sentences

than control sentences. An explanation in terms of associations to one or another constituent of the target sentence can be decisively rejected. However, it might be maintained that the strengths of the associations to the several constituent words are important in aggregate, according to some such rule as that their strengths are summed and that recall does not occur unless a threshold is reached.

That this interpretation is not very creditable is most readily seen from a clear case: Surely one would not wish to claim that actress evoked the last word of The woman was outstanding in the theater more than twice as often as the last word of The woman worked near the theater because the association between actress and outstanding tipped the scales. An actress, it should be further emphasized, is a woman who works, and it could hardly be the case that everything hinged on the relative strengths of preexisting associations of actress to in and near.

We are not arguing, of course, that relationships which may exist between the concepts signified by words are irrelevant. Our claim is rather that these relationships must be worked out when the words occur together in an utterance. Words do not have the same significance in isolation as they do in context. Hence, in the studies described in this paper, the processing crucial for the differential effects must have occurred at the time the sentences were encoded rather than when they were retrieved.

One aspect of the present data suggests that the general term itself was encoded. If only an instantiation were stored and remembered subjects would frequently substitute the particular term naming this example in place of the general term. However, the free recall data from Experiments 2 and

3 indicated that particular terms were substituted in only about 11% of the cases in which sentences were recalled at all. Thus there must have been some sort of representation of the general term. On the other hand, instantiated representations must also have played a role. Otherwise neither the cued recall data nor the fact that there were some substitutions of particular terms in free recall could be explained.

The failure to obtain a larger number of substitutions of particular terms for general ones can be accommodated within the instantiation hypothesis. It is simply necessary to assume that every stage of processing leaves a memorial trace. Specifically, there must be a trace for the surface form of the message. While early studies seemed to indicate that memory for surface structure is extremely shortlived (cf. Sachs, 1967; Jarvella, 1970), there is a growing body of evidence which shows longer term memory for surface features (cf. Anderson, 1974; Anderson & Biddle, 1975; Brewer and Bock, 1976; Hintzman, Block, & Inskeep, 1972; Kintsch, 1974; Kolers & Ostry, 1974). If memory for the surface information is available when recall is attempted, then instantiations may fail to appear in subject protocols due to output editing (cf. Cofer, 1961, 1967). The idea is that remembering begins with retrieval or generation of the semantic representation. Then this representation is coded into language and there is a check to see if there is a trace for this surface form. If there is a match, the response is made. If not, depending upon demand characteristics, a search is made for the original wording. It will often be available, particularly when the interval is short, so it is not surprising that the general terms in the original sentences tended to be reproduced in free recall, and this

fact is not inconsistent with the instantiation hypothesis.

Why do people appear to encode general terms on the basis of exemplars? There is no well-motivated reason why instantiation should occur from the perspective of theories which assume fixed, abstract encodings for words. As was explained in the introduction the whole raison d'être of such theories is to account for the generality of language. The rich and variable particularity of actual instances of language comprehension is, therefore, something of an embarrassment to this view.

Two possible explanations for instantiation will be considered. The first follows in a straightforward way from the dual code theory of Paivio (1969, 1971): People require a concrete level of representation so that an image can be formed. There are a priori reasons why an appeal to imagery is not sufficient to account for the phenomenon of instantiation. First there is the matter of just what an image of an instance is (Pylyshyn, 1973). It couldn't be a "raw" record of an encounter with an example, because a single example has to be recognized in various guises and perspectives. If an image of a particular case is argued to be an idealized, canonical form, some measure of abstraction has already been admitted.

A second problem with the view that the meaning of a term consists of nothing but images of the cases which it names is that a person is left in the grip of his/her history. How previously unencountered cases are identified, something people are presumably able to do, becomes a puzzle. It is no solution to say that a new instance will be labeled the same as known ones if it is similar to them, for then the question becomes, "Similar in what respects?" All of the answers boil down to positing abstract

characteristics which the new case shares with the old. Thus, while an imagery theory does give an explanation for instantiation, it would appear to be vulnerable to serious objections. It is at least an incomplete explanation.

Consider next what can be called a coherence formulation of instantiation. The idea is that a person often must make assumptions about particulars that go beyond that which is given in a message in order to construct a consistent and satisfying overall interpretation. Words are polysemous in a deep and pervasive sense (Anderson & Ortony, 1975). A person has to instantiate to place a construction upon a word which selects from among the indefinitely many gradations in meaning it could take on, and which fits into the representation or schema built up for the message as a whole. Every theorist recognizes the need to provide different readings for categorically distinct senses of words, as in bank, a financial institution, and bank, the side of a river. All we are proposing is to extend this principle to what traditionally would have been called the "same" sense.

Our conjecture is that people instantiate in order to give utterances a coherent interpretation. Here we can give only a sketch of what we mean by coherence, and how the process of giving an interpretation might work. Extended discussions generally consistent with this one can be found in Schank and Abelson (1975), Rumelhart and Ortony (1976) and Anderson (1976). It is supposed that knowledge is incorporated in schemata, which are abstract and stereotyped descriptions of things and events. Schemata are abstract in the sense that they contain a slot or place holder for each constituent element in a knowledge structure. They are stereotyped in that

they indicate the typical relationships among the elements. Comprehension of a message entails filling the slots in the relevant schemata with particular cases in such a way as to jointly satisfy the constraints of the message and the schemata. In other words, the instantiated cases will be the ones required for the representation as a whole to make sense.

Fillmore (1972) has provided an analysis of verbs of judging, such as accuse, blame, criticize, and praise, that makes a good illustration of the schema notion. Each of the capitalized words in the following designates a type of slot. Verbs of judging involve a Situation, which is an action, deed, or state of affairs, that may impact favorably or unfavorably upon the Affected. The Situation may have been brought about by a Defendant. A Judge renders a moral judgment about the Situation or the Defendant's responsibility. His judgment is offered to an Addressee. According to Fillmore, the "role structure" or schema for accuse is: A Judge says to an Addressee that a Defendant is responsible for a bad Situation. An utterance can be interpreted in terms of this schema if the slots can be filled with particular cases that interrelate in the specified manner. John accused Harry of writing the letter permits of a coherent interpretation when John is the Judge, Harry is the Defendant and writing the letter is the bad Situation. The Addressee is indeterminate from the information given. Perhaps it is Harry.

The ingredients needed to fill the slots in schemata will not always be found in the message itself. Writing a letter is not usually bad, but the accuse schema in the foregoing illustration requires that the Judge regard the act as bad. An analogy will make the point more forcefully.

One has no trouble visualizing that an object is a cube even though some of its faces are not in view. A coherent account requires assumptions about the faces which are not directly perceivable, and ordinarily the conviction about assumed elements will be as strong as the belief in features that are accessible to the eye (Kuipers, 1975). So it is with language comprehension. We supply such particulars as are needed to make the message coherent.

Applying these notions to one of our sentences, The woman was outstanding in the theater, the interplay between the schemata for theater and outstanding may be supposed to deliver the implication that a person can be outstanding in the theater by doing an excellent job of acting. Therefore, the woman mentioned is likely to be a woman who acts, and a woman who acts is an actress. A farfetched interpretation is otherwise required for the sentence to be meaningful. To be sure, the woman might have been a doctor from the audience whose outstanding feat was to perform a tracheotomy on a member of the cast, but in the absence of extraordinary information it is likely that people will instantiate on the basis of high probability inferences.

The schema consistency explanation of instantiation does not require any commitment with respect to the modality of a mental representation. It need not be embodied as an image or as subvocal speech. Nor, unlike an imagery interpretation, does the view force one to conclude that instantiation always involves a great amount of detail. Quite the contrary. A person may even ignore specifics available in a message if these specifics are irrelevant to or inconsistent with the schemata from which he/she is trying to construct an interpretation.

One final caveat. An imagery theory by itself does not give a clue as to why, for instance, a woman who is outstanding in the theater is going to be regarded as an actress rather than a doctor. If all that is required is a concrete instantiation of woman, so that an image can be formed, a doctor or a waitress or a secretary will do as well as an actress.

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Table 1

Mean Proportion Recalled as a Function of Type of Sentence and Cue, Experiment 1

	Sentence	
Cue	Target	Control
Particular	.61	.30
General	.37	.34

Table 2

Mean Proportion Recalled as a Function of Type of Sentence and Cue, Experiment 2

	Sentence		
Cue	Target	Control 1	Control 2
Particular	.42	.23	.003
General	.33	.31	.00

Table 3

Mean Proportion Recalled as a Function of Type of Sentence and Cue, Experiment 3

	Sentence		
Cue	Target	Control 1	Control 2
Low associate	.45	.23	.04
High associate	.31	.33	.02